

REMARKS

Claims 1-5 and 7-9 are presently pending in the application.

Claim 1 has been amended to recite that the composition contains no zinc dialkyl dithiophosphates, which is supported in the specification at least at page 29, last nine lines, which teach that all of X1 to X6 are preferably oxygen, and in Inventive Examples 1 and 3-9, which contain no ZnDTP. Additionally, claims 1-5 and 7-9 have been amended for clarity. No new matter has been added by these amendments, and entry is respectfully requested.

In the Office Action, the Examiner has rejected claims 1-9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,569,818 of Nakazato ("Nakazato") in view of U.S. Patent No. 5,792,733 of Minami et al. ("Minami") or U.S. Patent No. 5,245,070 of Nishikawa et al. ("Nishikawa"). The Examiner argues that Nakazato teaches a lubricating oil composition having a low phosphorus content of 0.01 to 0.1 weight %, a sulfur content of 0.01 to 0.3 weight %, and a sulfated ash in an amount of 0.1 to 1 weight % which comprises: (a) a major amount of mineral base oil having a low sulfur content of at most 0.1 weight %, (b) an ashless alkenyl or alkyl-succinimide dispersant or derivative thereof in an amount of 0.01 to 0.3 weight % in terms of nitrogen content, and (c) a metal-containing detergent such as an alkali metal or an alkaline earth metal salt of an alkylsalicylic acid in an amount of about 0.2 to 7 weight %. The composition may allegedly include other metal detergents, such as sulfonate detergents, (d) a zinc dialkyl-dithiophosphate in an amount of 0.01 to 0.1 weight % in terms of phosphorus content, and (e) an oxidation inhibitor which may be a phenol compound or an amine compound in an amount of 0.01 to 5 weight %. The Examiner argues that Nakazato teaches that the lubricating oil composition may be used in internal combustion engines, including gas engines.

The Examiner further argues that the open ended claim language allows for the addition of other additives to the oil compositions, including the zinc dialkyl dithiophosphate component of the prior art. Nakazato allegedly teaches that the lubricating oil compositions may contain other auxiliary additives, such as phosphoric acid esters and phosphorous acid esters. The Examiner acknowledges that Nakazato does not teach or suggest the claimed specific phosphorus acid ester compound, a triphosphate of formula (1).

However, the Examiner argues that such triphosphate compounds are well known in the art as antiwear agents in lubricating oil compositions, as evidenced by Minami or Nishikawa. The Examiner points in particular to the phosphorus-containing compounds represented by the formula in col. 1, lines 52-58 of Minami, in which all of the X substituents are oxygen, and the disclosure of Minami of lubricating oil compositions suitable for use in internal combustion engines in col. 2, lines 3-23. The Examiner further argues that Nishikawa discloses alkyl phosphates in col. 2, lines 9-15, which may be used as additives to lubricants. The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time of the invention to have added the triphosphate compound of Minami or Nishikawa to the oil composition of Nakazato if its known imparted properties was so desired, and that Nakazato allows for the addition of phosphorus-containing compounds to the lubricating oil compositions. Applicants respectfully traverse this rejection as follows.

The presently claimed invention is directed to a lubricating oil composition for an internal combustion engine that contains no zinc dialkyldithiophosphates and that comprises a lubricating base oil; (A) a triphosphate represented by formula (1) in an amount of 0.01 to 0.2 percent by mass in terms of phosphorus; (B) a succinimide and/or derivative thereof in an amount of 0.01 to 0.3 percent by mass in terms of nitrogen; (C) an alkali metal or alkaline earth metal detergent in an amount of 0.05 to 1 percent by mass in terms of metal; and (D) a phenol-based and/or amine-based anti-oxidant in an amount of 0.01 to 3 percent by mass.

The importance of excluding zinc dialkyldithiophosphates from the presently claimed compositions is demonstrated in the present application. For example, the composition of Example 1 (inventive), containing no zinc dialkyldithiophosphates, exhibited better base number retention properties and superior high temperature detergency than the composition of Example 2 (comparative), containing ZnDTP. Further, the composition of Example 9 (inventive), containing no zinc dialkyldithiophosphates, exhibited better low friction characteristics than the composition of Comparative Example 3 (comparative), containing ZnDTP. Accordingly, it has been clearly demonstrated that compositions which do not contain zinc dialkyldithiophosphates, as claimed, exhibit superior properties.

In contrast with the presently claimed invention, Nakazato teaches a lubricating oil composition having specific phosphorus, sulfur, and sulfated ash contents and containing: (a) a mineral base oil, (b) an ashless alkenyl or alkyl-succinimide dispersant, (c) a metal-containing

detergent, (d) ZnDTP, and (e) an oxidation inhibitor. Essential component (d), zinc dialkyldithiophosphate, is present in an amount of 0.01 to 0.1 wt % in terms of phosphorus content (col. 6, lines 26-37). The ZnDTP preferably contains an alkyl or alkylaryl group having 3 to 18 carbon atoms, and particularly preferred are alkyl groups derived from a secondary alcohol or a mixture of secondary and primary alcohols, since the latter are taught to provide high heat resistance. The ZnDTP is an essential component of the Nakazato composition and is contained in all of the Example compositions of Nakazato.

Accordingly, Nakazato does not teach or suggest a composition containing no zinc dialkyldithiophosphates as claimed. Furthermore, even if one skilled in the art were to include the triphosphate compounds of Minami or Nishikawa as anti-wear agents in the lubricating oil composition of Nakazato, as suggested by the Examiner, the resulting composition would still contain zinc dialkyldithiophosphate. Accordingly, even the proposed combination of references, if proper, would not teach or suggest all of the claimed elements and reconsideration and withdrawal of the § 103(a) rejection based on Nakazato in view of Minami or Nishikawa are respectfully requested.

In view of the preceding Amendments and Remarks, Applicants respectfully submit that the pending claims are patentably distinct from the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

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Enclosure: Petition for Extension of Time (one-month)